

# ***IES-1000***

## ***Integrated Ethernet Switch***

July 2002

Version 2.04

## ***Hardware Installation Guide***

# **ZyXEL**

TOTAL INTERNET ACCESS SOLUTION

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## **IES-1000 Integrated Ethernet Switch**

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# Preface

Congratulations on your purchase of the IES-1000 Integrated Ethernet switch.

This guide shows you how to set up the hardware for your IES-1000.

## About the IES-1000

The IES-1000 is an integrated Ethernet switch that multiplexes traffic from up to 16 G.SHDSL or ADSL subscribers (or eight of each) into two 10/100M Ethernet ports that connect to a WAN network via a WAN switch.

## Syntax Conventions

“Enter” means for you to type one or more characters and press the carriage return. “Select” or “Choose” means for you to select one from the predefined choices.

For brevity’s sake, we will use “e.g.” as shorthand for “for instance”, and “i.e.” as shorthand for “that is” or “in other words” throughout this manual.

## Related Documentation

### User’s Guide

The User’s Guide explains firmware setup, management and maintenance procedures.

### Glossary and ZyXEL Web Site

Please refer to [www.zyxel.com](http://www.zyxel.com) for an online glossary of networking terms or the ZyXEL download library for additional support documentation.



# Chapter 1

## IES-1000 Applications

*This chapter describes IES-1000 applications and basic operating environment.*

## 1.1 Applications

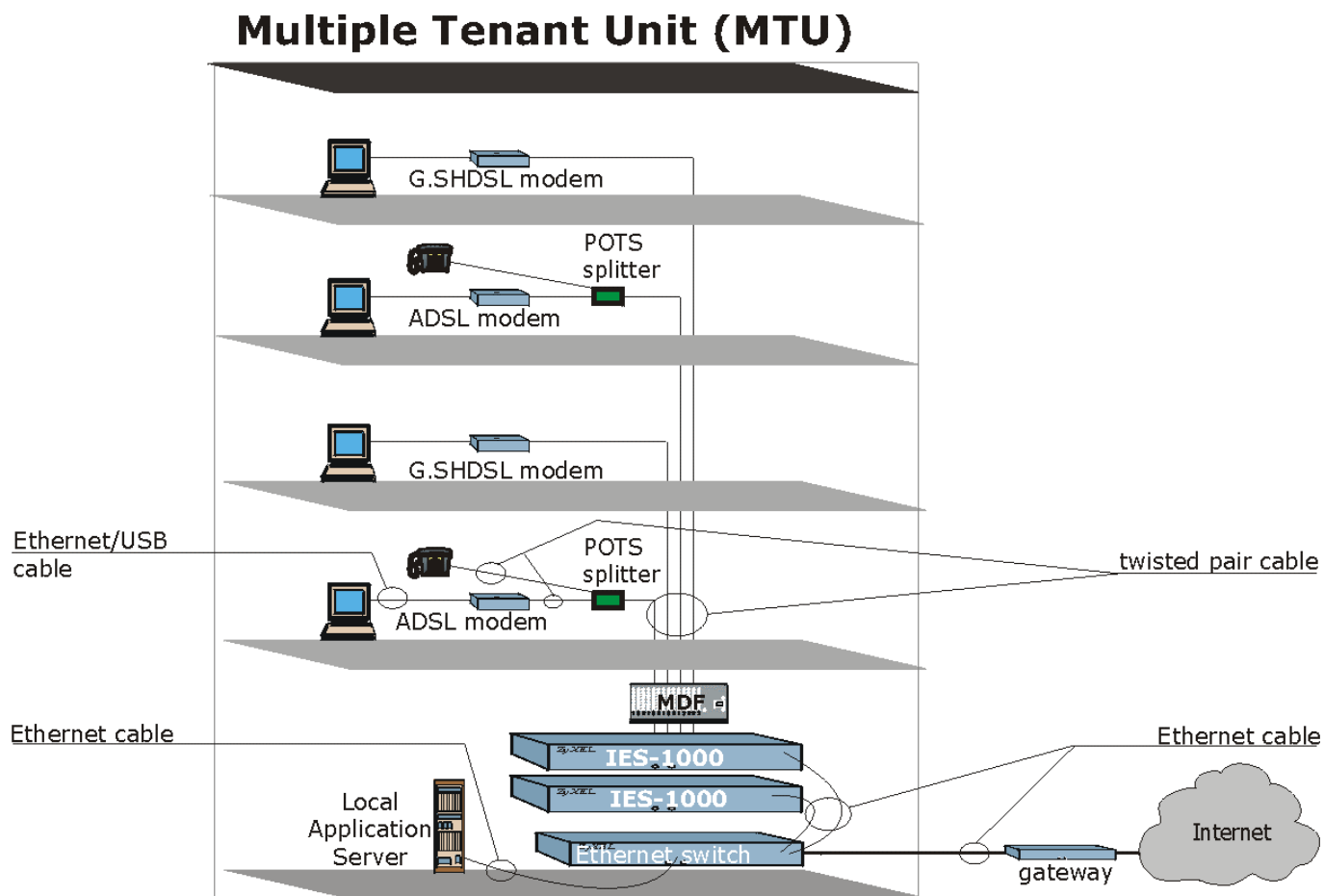
The following are typical DSL multiplexing applications of the IES-1000.

1. Multiple Tenant Unit (MTU)
2. Enterprise

### 1.1.1 MTU Application

The following figure depicts a typical application of the IES-1000 in a large residential building, or Multiple Tenant Unit (MTU), that leverages existing phone line wiring to provide Internet access to all tenants.

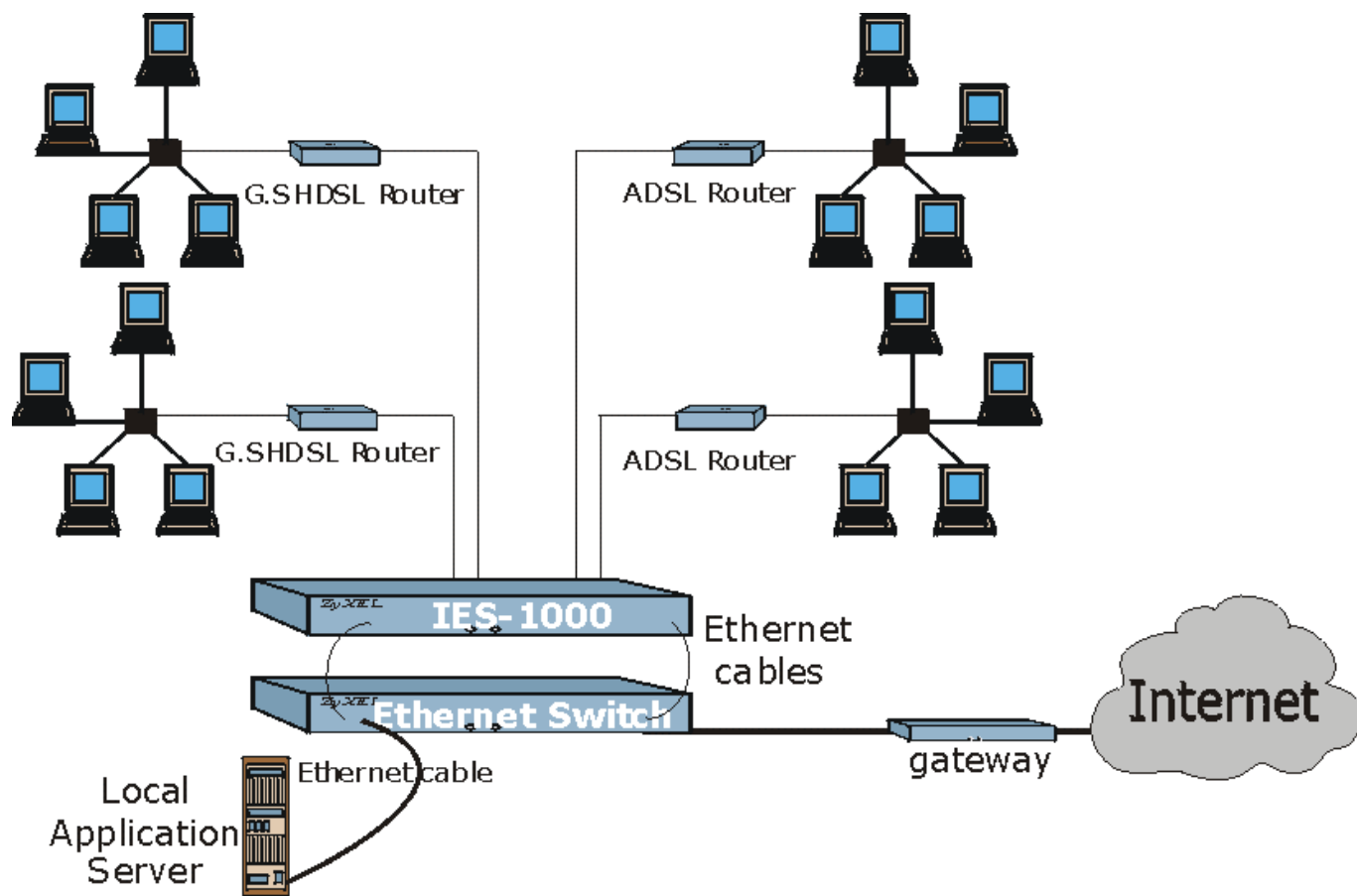
A tenant connects a computer to the phone line in a unit using a G.SHDSL or ADSL modem. The other end of the phone line is connected to a port on the IES-1000. The IES-1000 aggregates the traffic from the tenants to the Ethernet port and forwards it to a router or switch. The router (or switch) then routes the traffic further to the Internet.



**Figure 1-1 IES-1000 Building Deployment Example**

## 1.1.2 Enterprise Application

The IES-1000 can also be used in any-sized company to multiplex traffic from employee G.SHDSL or ADSL connections to the Internet. Multiplex traffic from up to 16 connections and use a hub or switch to multiplex more.



**Figure 1-2 Enterprise Application**



# Chapter 2

## Hardware Installation

*This chapter shows you how to install hardware for a free-standing or rack-mounted scenario.*

## 2.1 Environment

The following are the recommended environments for the IES-1000.

### 2.1.1 Operating Environment

Temperature: 0 — 50°C; Humidity: 5% — 95% (non-condensing)

### 2.1.2 Storage Environment

Temperature: -25 - 70°C; Humidity: 5% - 95% (non-condensing)

---

**Refer also to the *Hardware Specification Appendix*.**

---

## 2.2 Free-standing IES-1000 Installation Requirements

Position the IES-1000 on a flat surface. Remember that the unit requires proper ventilation.

## 2.3 Rack-mounted IES-1000 Installation Requirements

- Two mounting brackets (supplied).
- Eight M3 flat head screws (supplied) and a #2 Philips screwdriver.
- Four M5 flat head screws and a #2 Philips screwdriver.

## 2.4 Mounting the IES-1000 on a Rack

### **Precautions:**

- Make sure the rack will safely support the combined weight of all the equipment it contains.
- Make sure the position of the IES-1000 does not make the rack unstable or top-heavy. Take all necessary precautions to anchor the rack securely before installing the unit.

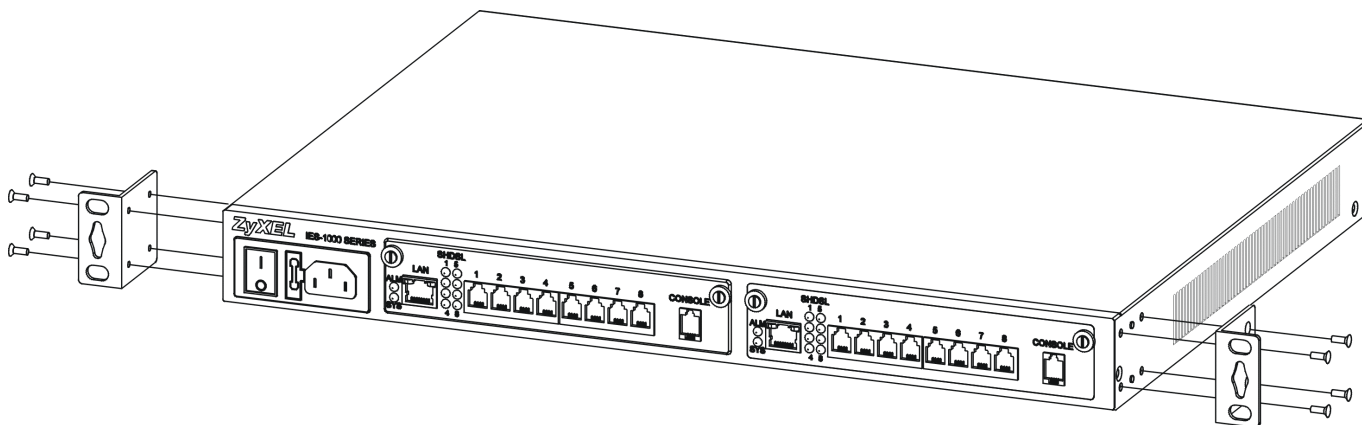
## 2.4.1 Attaching the Mounting Brackets to the IES-1000

- Step 1.** Position a mounting bracket on one side of the IES-1000, lining up the four screw holes on the bracket with the screw holes on the side of the unit (see the figure shown next).

---

**Failure to use the proper screws may damage the unit.**

---



**Figure 2-1 Attaching the Mounting Brackets to the IES-1000**

- Step 2.** Using a #2 Philips screwdriver, install the M3 flat head screws that came with the brackets through the mounting bracket holes into the IES-1000.
- Step 3.** Repeat Step 1 and Step 2 to install the second mounting bracket on the other side of the unit.

You may now mount the IES-1000 on a rack. Proceed to the next section.

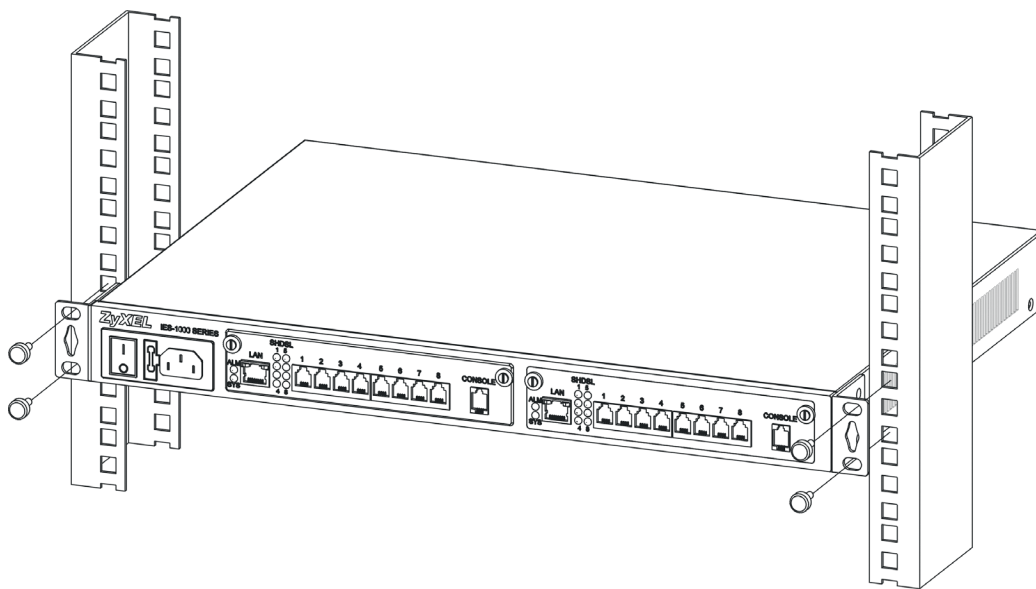
## 2.4.2 Mounting the IES-1000 on a Rack

- Step 1.** Position a mounting bracket (that is already attached to the IES-1000) on one side of the rack, lining up the two screw holes on the bracket with the screw holes on the side of the rack (see the figure shown next).

---

**Failure to use the proper screws may damage the unit.**

---



**Figure 2-2 Mounting the IES-1000 on a Rack**

- Step 2.** Using a #2 Philips screwdriver, install the M5 flat head screws through the mounting bracket holes into the rack.
- Step 3.** Repeat Step 1 and Step 2 to attach the second mounting bracket on the other side of the rack.



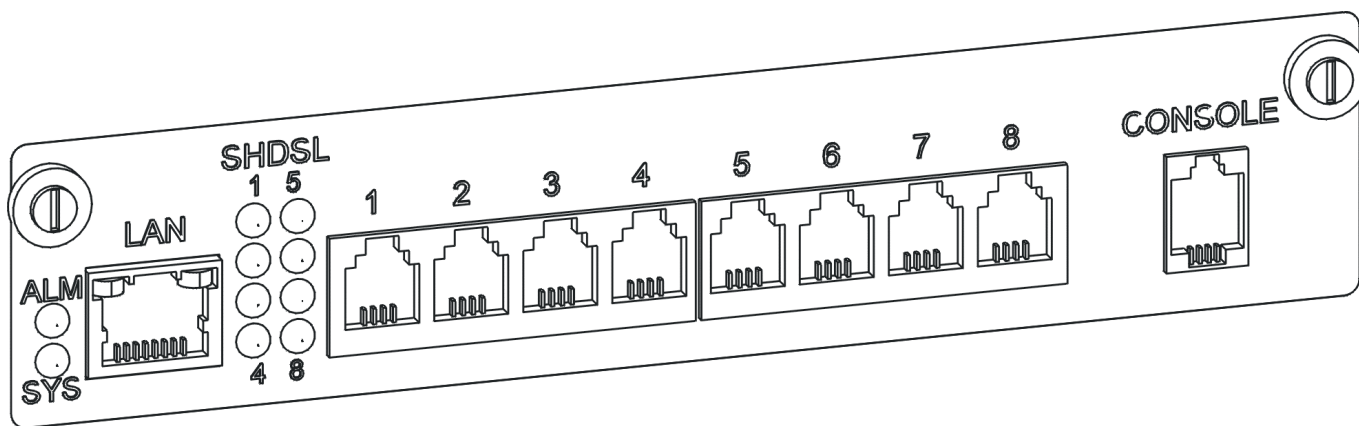


# Chapter 3

## Removing and Installing Network Modules

*This chapter shows you how to remove and install network modules.*

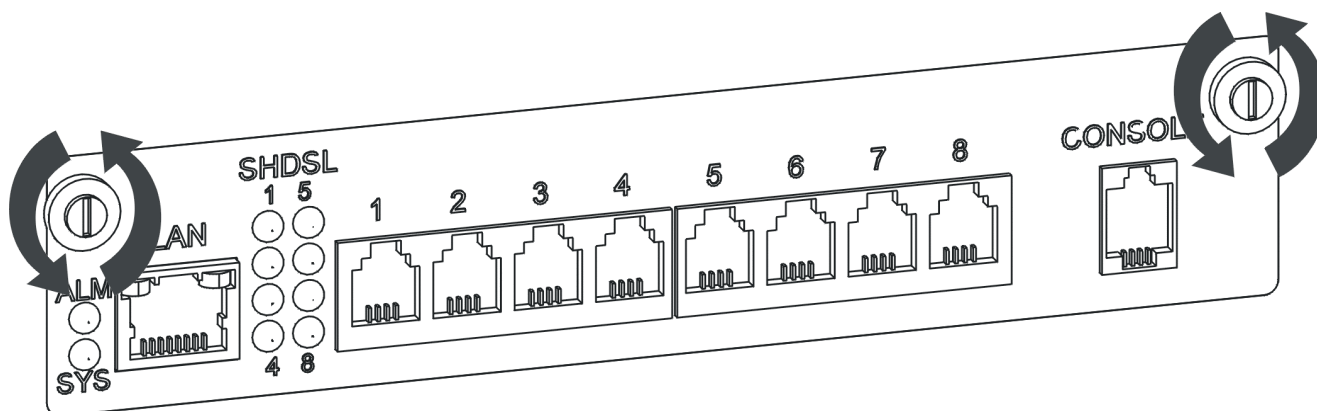
Each IES-1000 accommodates up to two network modules. Remove and install modules via the front of the IES-1000. The figure below shows the front view of a SAM1008 network module; the procedures for removing and installing AAM1008 network modules are the same.



**Figure 3-1 The IES-1000 G.SHDSL SAM1008 Network Module**

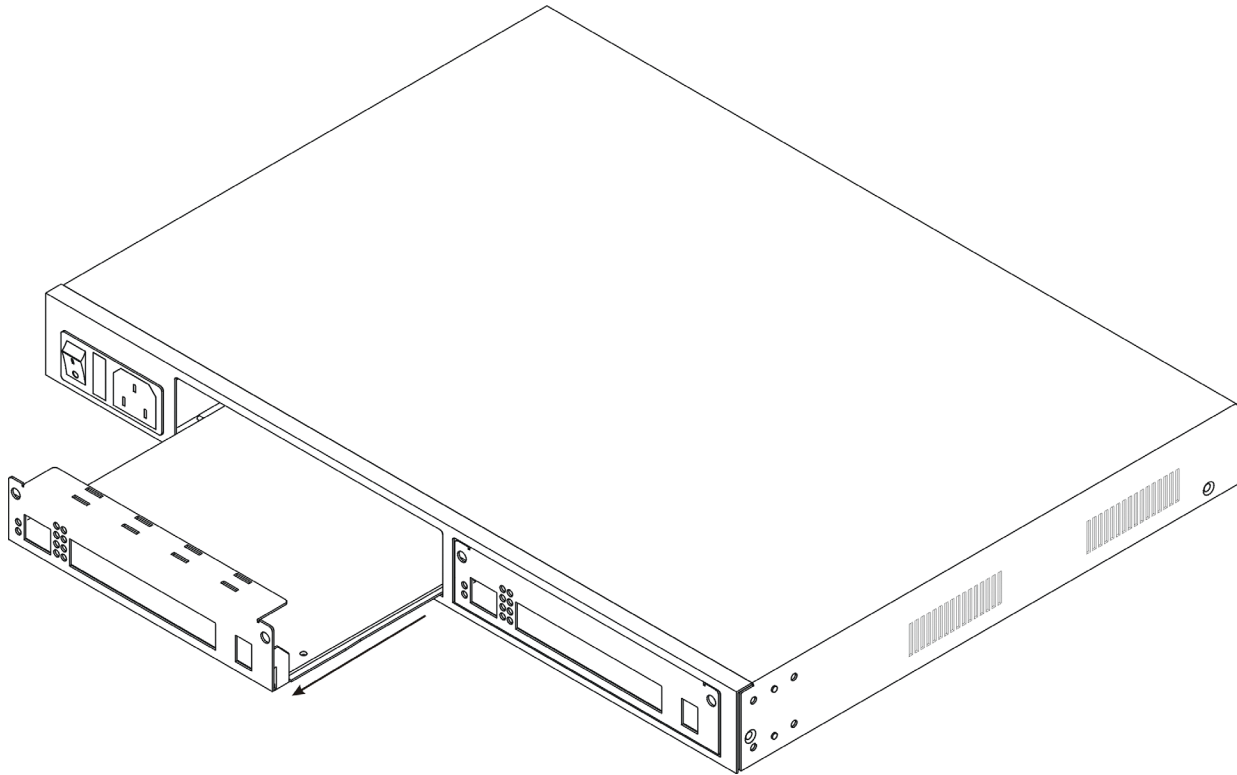
### 3.1 Removing a G.SHDSL SAM1008 Network Module

**Step 1.** Loosen the two screws on the front panel that secure the module to the chassis by turning them counter-clockwise as shown next.



**Figure 3-2 Loosen Module Screws**

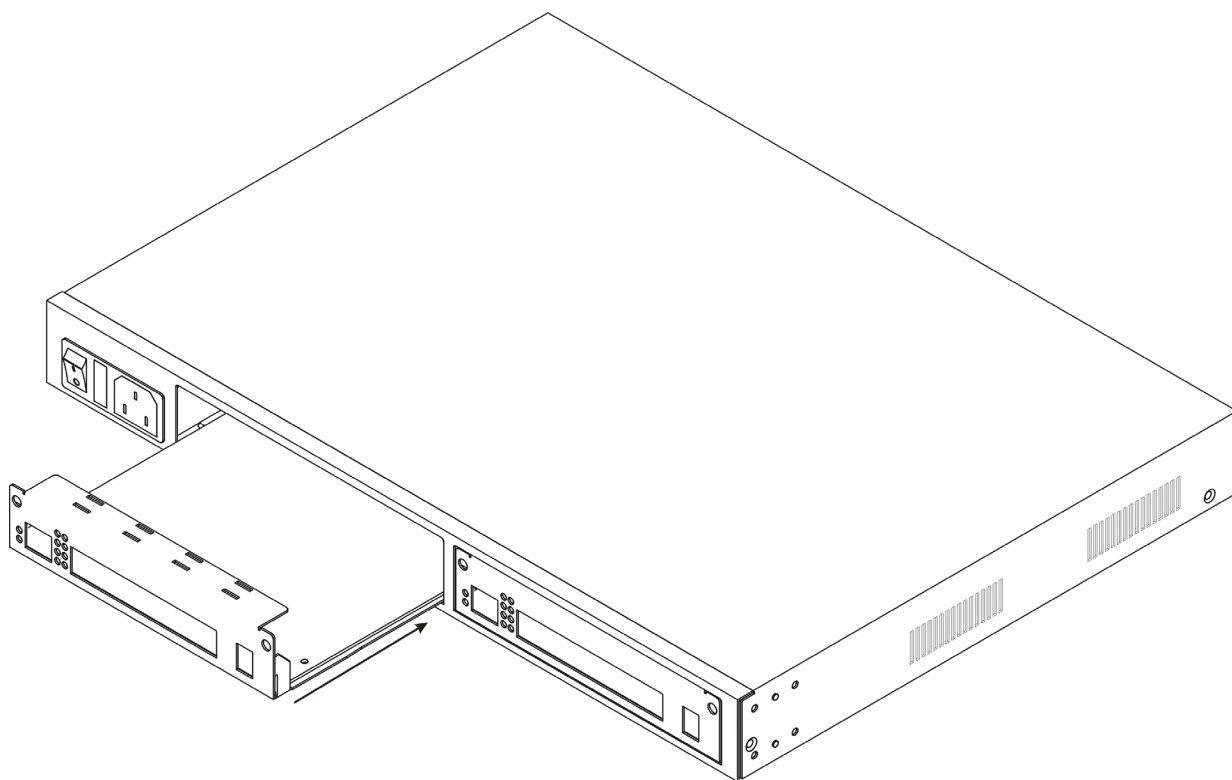
**Step 2.** Gently pull the network module out of the chassis as shown next.



**Figure 3-3 Removing a Network Module from the IES-1000 Chassis**

## 3.2 Installing a Network Module

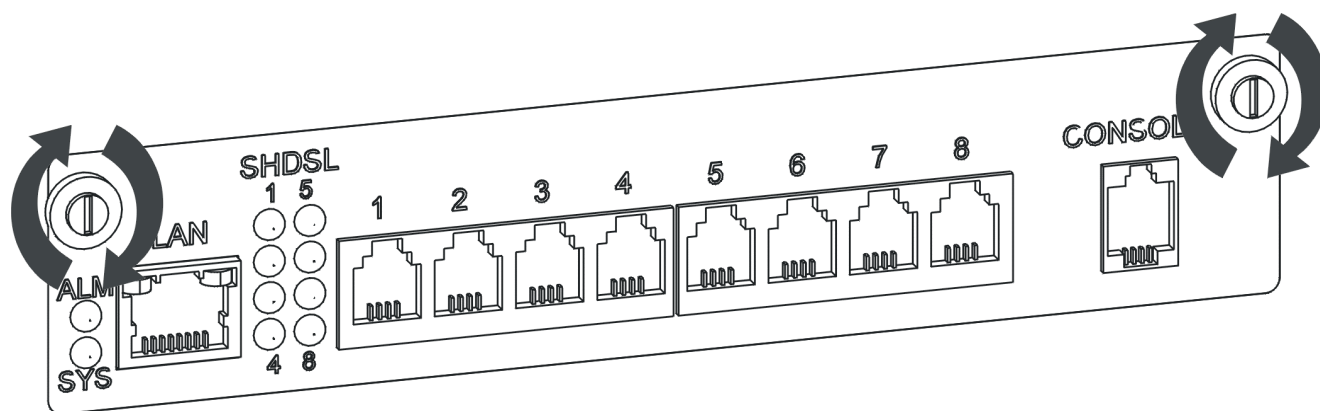
- Step 1.** Hold the module with the network ports facing you and insert it into an empty slot located on the front of the IES-1000 as shown next.
- Step 2.** Push the bottom of the front of the module into the IES-1000. The front of the module should be flush with the IES-1000 chassis.



**Figure 3-4 Installing a Network Module into the IES-1000 Chassis**

**The front of the network module must be flush with the front of the IES-1000 after you install a network module or it will not work!**

**Step 3.** Secure the module to the chassis by turning the two screws on the front of the module clockwise as shown next.



**Figure 3-5 Tighten Module Screws**



## Chapter 4

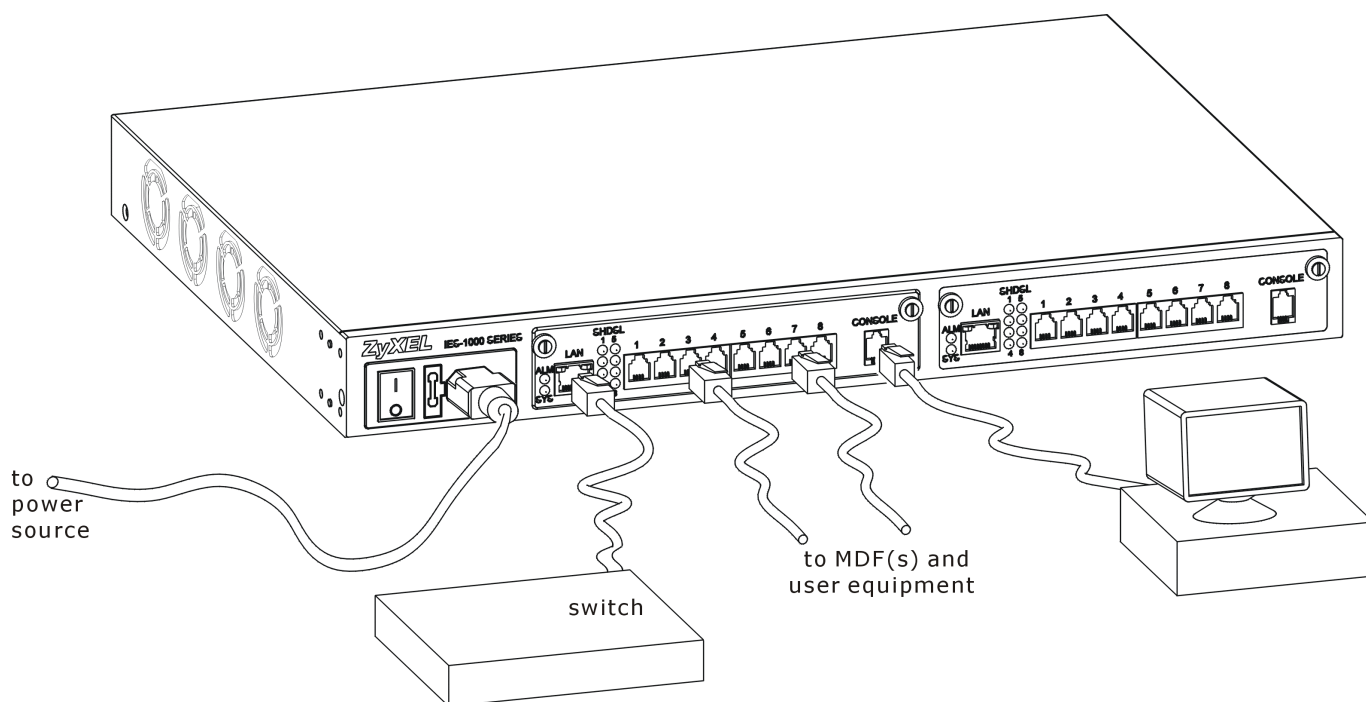
# IES-1000 Connections

*This chapter shows you how and where to make hardware connections.*

Before you make your hardware connections, make sure that your IES-1000 is safely and securely positioned.

### 4.1 Front Panel Connections

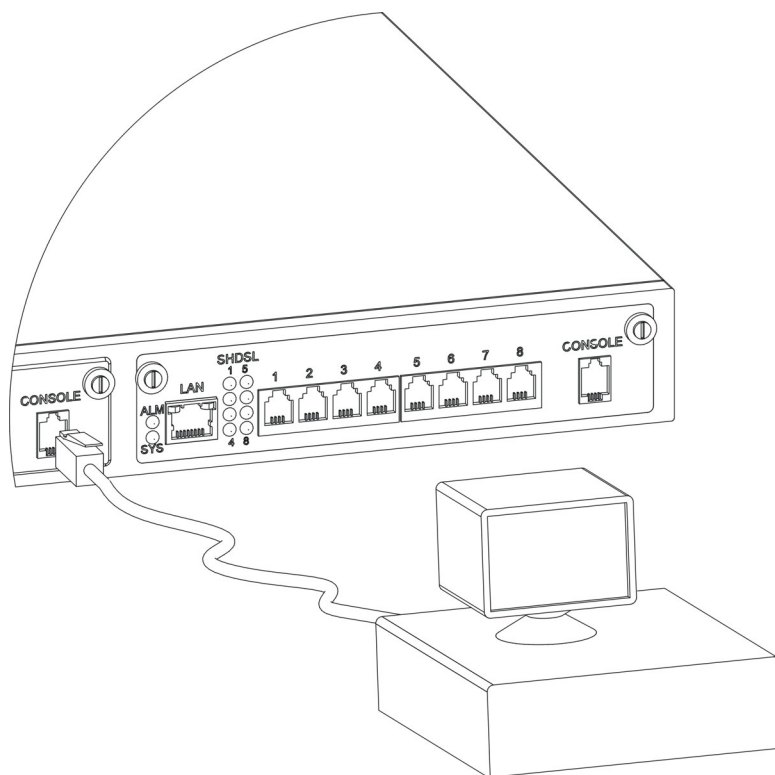
All connections are made on the front panel of the IES-1000. The following figure shows the front panel connections of the SAM1008. A more detailed discussion follows. Connections for the AAM1008 are the same except for the DSL ports (see 4.4 for details).



**Figure 4-1 SAM1008 Front Panel Connections Overview**

### 4.2 Console Port

For the initial configuration, you need to use terminal emulator software on a computer and connect it to a network module through the console port. Connect the mini-RJ-11 end of the console cable to the console port of the network module. Connect the other end to a serial port of your computer. After the initial setup, you can modify the configuration remotely through Telnet connections.



**Figure 4-2 Console Port Connection**

## 4.3 SHDSL Port Connections

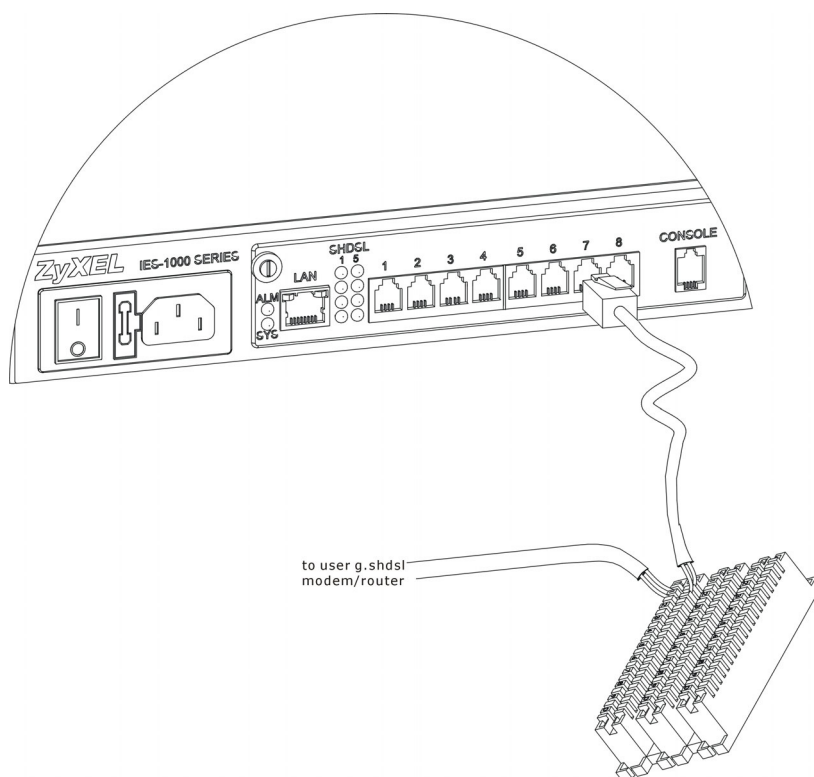
The SHDSL ports connect to an MDF (Main Distribution Frame) and end-user equipment via telephone wire.

- For detailed specifications about the associated RJ-11 connector, refer to the *Pin Assignment* appendix.
- For more detail about MDF connections refer to the *Notes About MDFs (Main Distribution Frames)* shown later in this section.

The procedure shown next explains how to complete a single G.SHDSL connection (SAM1008) to an MDF via an SHDSL port. Instructions on ADSL connections (AAM1008) come later.

### 4.3.1 Procedure to Complete a G.SHDSL Connection

- Step 1.** Connect the RJ-11 end of a telephone wire to the SHDSL port on the front panel of the SAM1008 as shown next.
- Step 2.** Connect the other end of the telephone wire to the upper port of an MDF (Main Distribution Frame) using a punch-down tool.

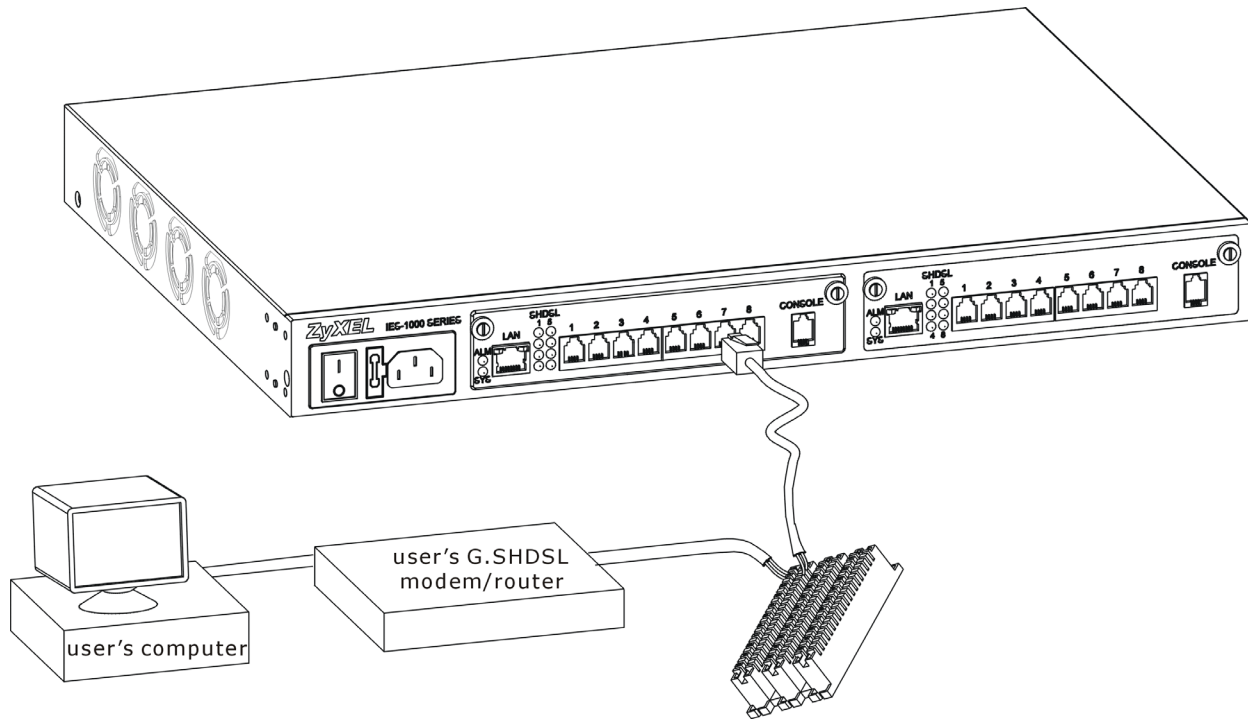


**Figure 4-3 SHDSL Port and MDF Connections**

**Step 3.** Connect a different telephone wire to the lower port of the MDF using a punch-down tool.

**Step 4.** Connect the other (RJ-11) end of the telephone wire to the end-user G.SHDSL modem/router.

When you finish this procedure your connections should look similar to the figure shown next. Connections between the user's computer and modem/router are not described here.

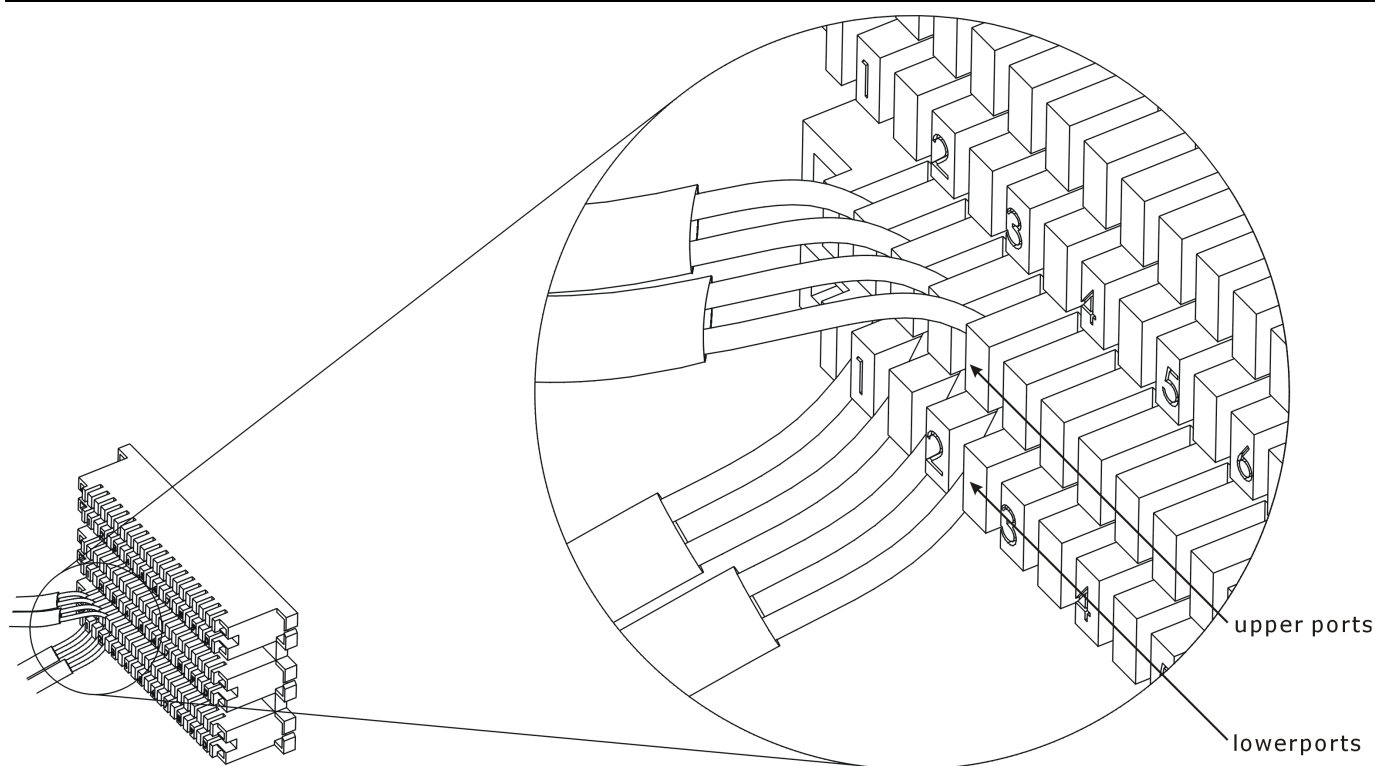


**Figure 4-4 SHDSL Port, MDF and User Equipment Connections**

### ***Notes About MDFs (Main Distribution Frames)***

An MDF is usually installed between end-users' equipment and the telephone company (CO) in a basement or telephone room. The MDF is the point of termination for the outside telephone company lines coming into a building and the telephone lines in the building.





**Figure 4-5 Magnified View of MDF Wiring**

Connect wiring from end-user equipment to the lower ports of an MDF using a telephone wire. Connect wiring from the telephone company to the upper ports of an MDF (see the previous figure).

Some MDFs have surge protection circuitry built in between the two banks; thus, do not connect telephone wires from the telephone company directly to the IES-1000.

Use a punch-down tool to seat telephone lines between MDF blocks.

*This chapter details how to connect ADSL wiring to MDFs based on your existing telephone wiring infrastructure.*

## 4.4 ADSL Port Connections

The AAM1008 network module can provide ADSL and voice services over the same telephone wiring. It also has built in splitters that save space and simplify installation.

The following figure gives an example of a basic installation scenario for using the AAM1008 to combine voice and data signals.

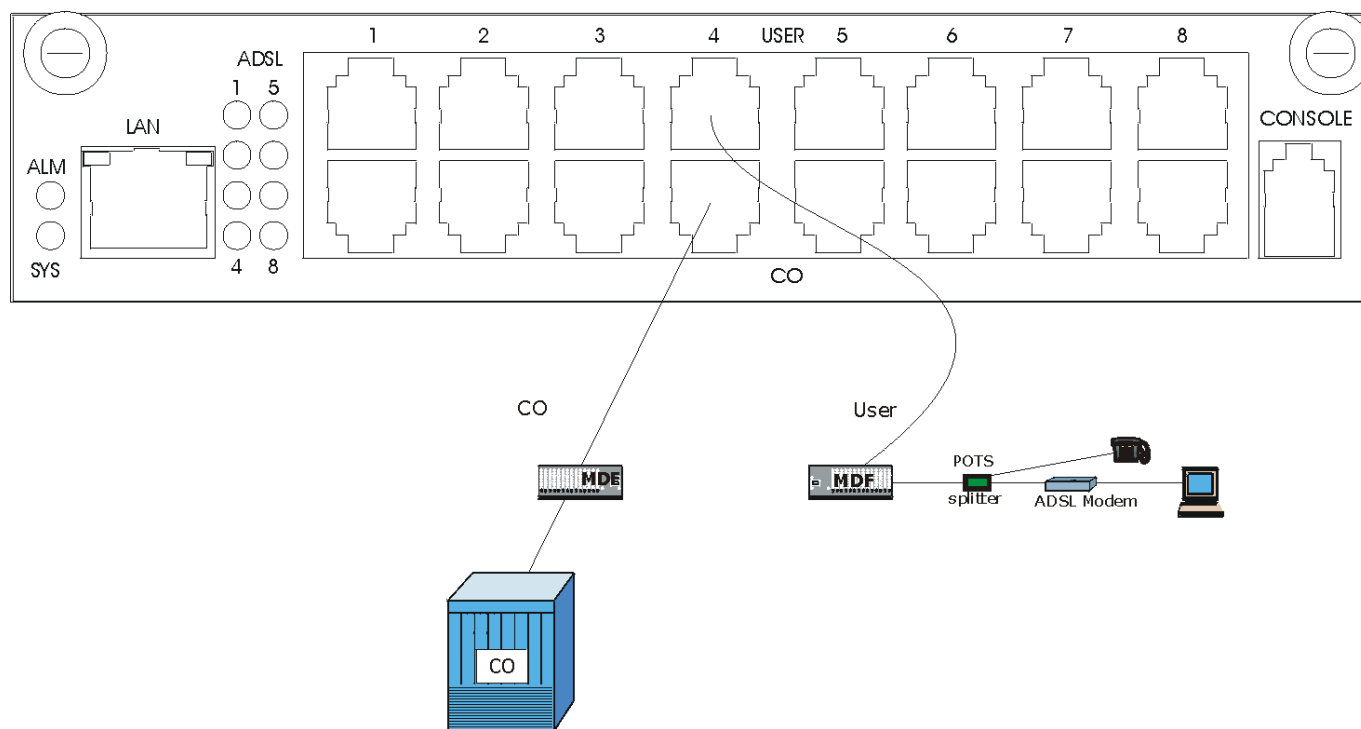


Figure 4-6 AAM1008 Installation Overview

---

**You can also use RJ-11 connectors on both ends of the telephone cables connect directly to an ADSL modem(s) or patch panel. This chapter discusses connections using MDFs.**

---

### 4.4.1 Typical Scenarios

Your existing telephone wiring usually depends on your region. Here are descriptions of three typical installation scenarios. See the *Notes About MDFs (Main Distribution Frames)* for more information about MDFs. Use telephone wires with RJ-11 jacks on one end (follow the pin assignments shown in the *Pin Assignments* Appendix) for connecting to the AAM1008.

### 4.4.2 Installation Scenario A

You want to install the AAM1008 network module in an environment where there are no previously installed MDFs. There is no phone service and you want to install the AAM1008 for data-access only. No connections from the CO ports are necessary.

You may connect using an MDF or attach RJ-11 connectors to the non-AAM1008 side of the telephone wire and then connect to ADSL modem directly.

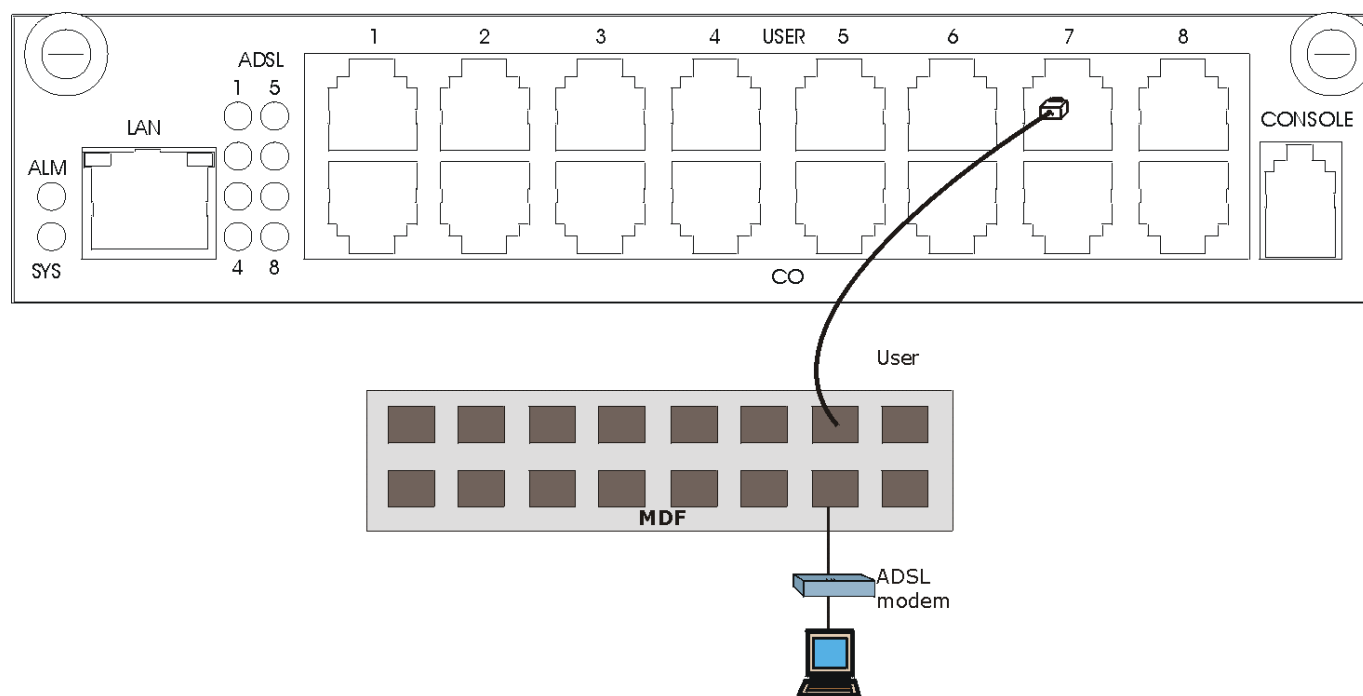


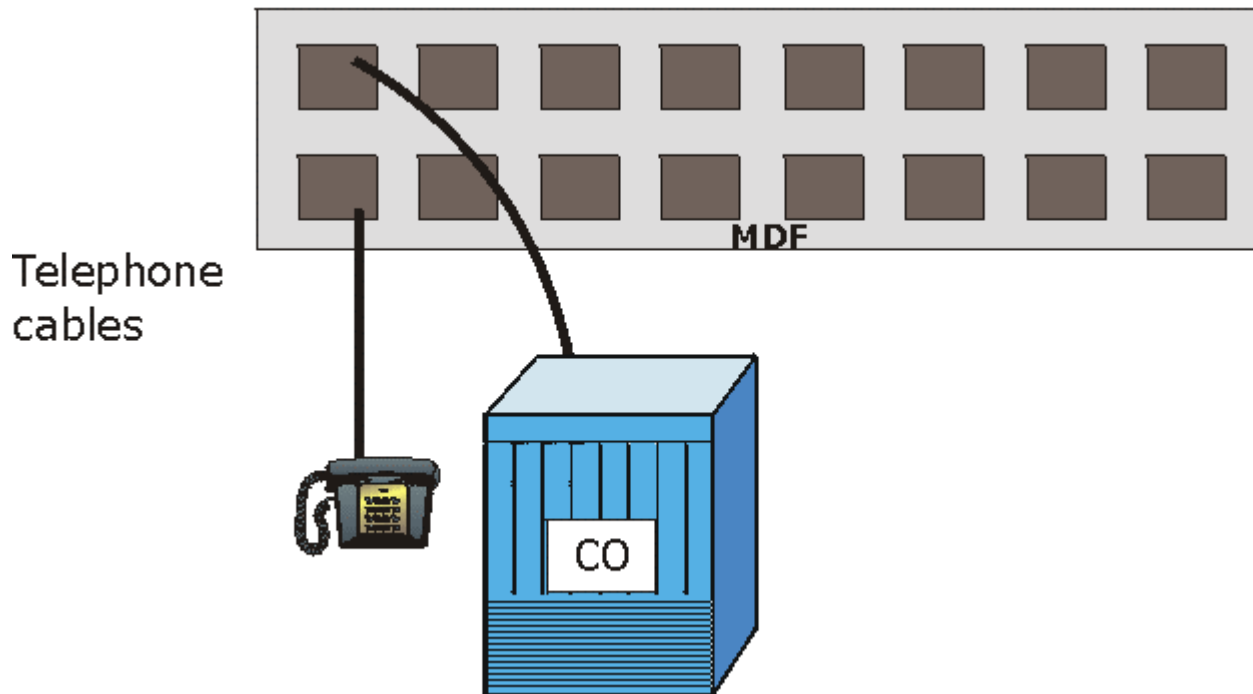
Figure 4-7 Installation Scenario A

### ***Procedure To Connect To An MDF***

- Step 1.** Connect the RJ-11 connector end of a telephone wire to one of the **USER** ports on the AAM1008.
- Step 2.** Connect the other end of the telephone wire to the upper ports of the MDF using a punch-down tool.
- Step 3.** Connect the telephone wiring from each end-user's ADSL modem to the lower ports of the MDF.

### **4.4.3 Installation Scenario B**

Phone service is available. There is one MDF from which end-users CO connections are made (see next figure).



**Figure 4-8 One MDF for End-user and CO Connections**

Please refer to the following figure for the connection schema.

- MDF 1 is the original MDF used for telephone connections only.
- MDF 2 is used for telephone connections only.
- MDF 3 is for ADSL service connections.

---

**Change the wiring (in the following figure) from MDF 1 to MDF 3 for telephone subscribers who want ADSL service.**

---

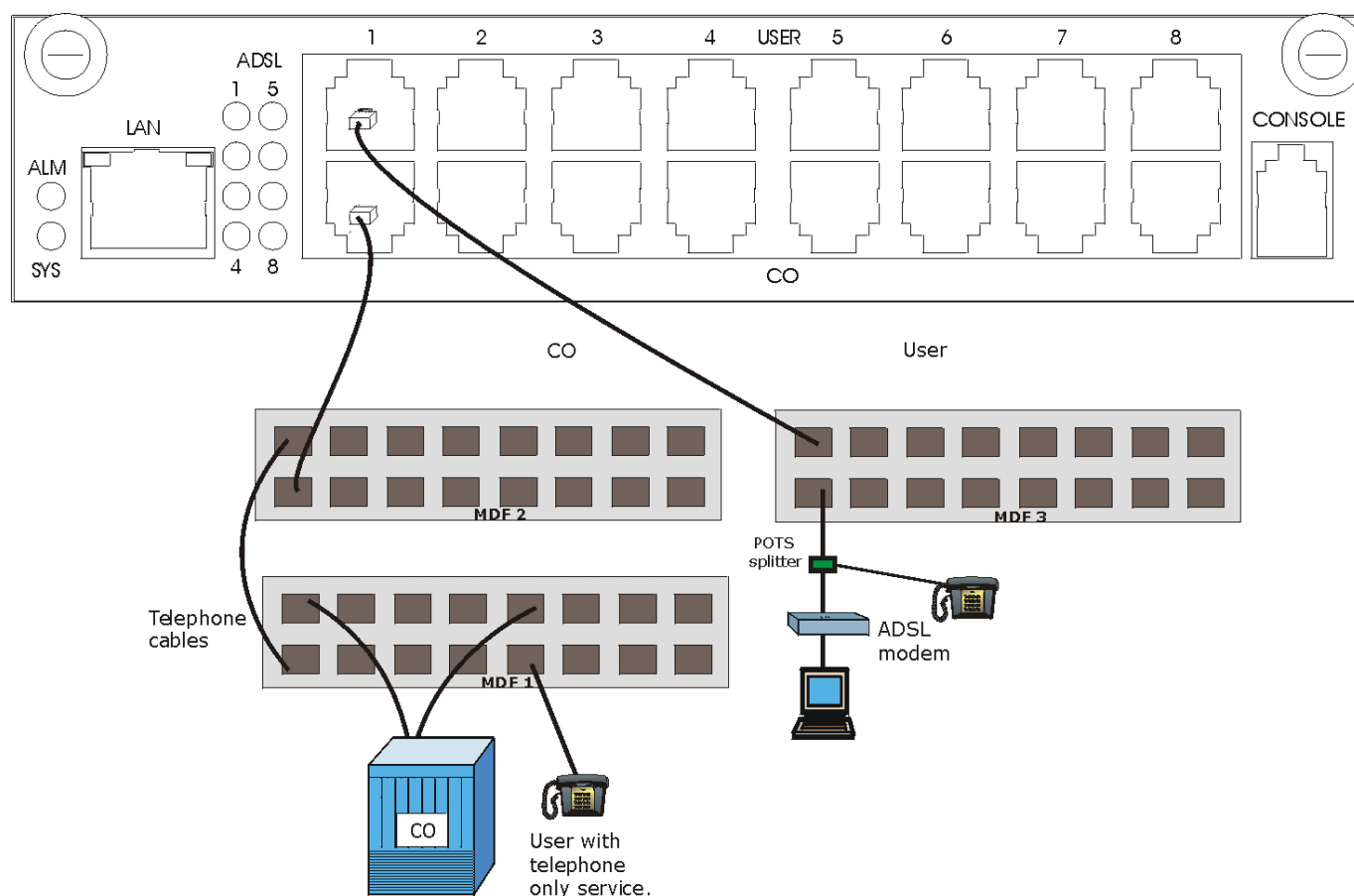


Figure 4-9 Installation Scenario B

### Procedure To Connect To MDFs

- Step 1.** Acquire two additional MDFs (MDFs 2 and 3).
- Step 2.** Connect the RJ-11 connector ends of telephone wires you want for ADSL service to the **USER** ports on the AAM1008.
- Step 3.** Connect the other ends of the telephone wires to the upper ports of MDF 3 using a punch-down tool.
- Step 4.** Connect the telephone wiring from the end-user's ADSL modem(s) to the lower ports of MDF 3.
- Step 5.** Connect the RJ-11 connector ends of telephone wires you want for phone service to the AAM1008 ports labeled **CO**.
- Step 6.** Connect the other ends of the telephone wires to the lower ports of MDF 2 using a punch-down tool.
- Step 7.** Connect the upper ports of MDF 2 to the lower ports of MDF 1 using regular telephone wires.
- Step 8.** Connect the upper ports of MDF 1 to the telephone company.
- Step 9.** Telephone subscribers only (that is, non-ADSL subscribers) retain connections to the lower ports of MDF 1.
- Step 10.** Change the wiring from MDF 1 to MDF 3 for telephone subscribers who want ADSL service.

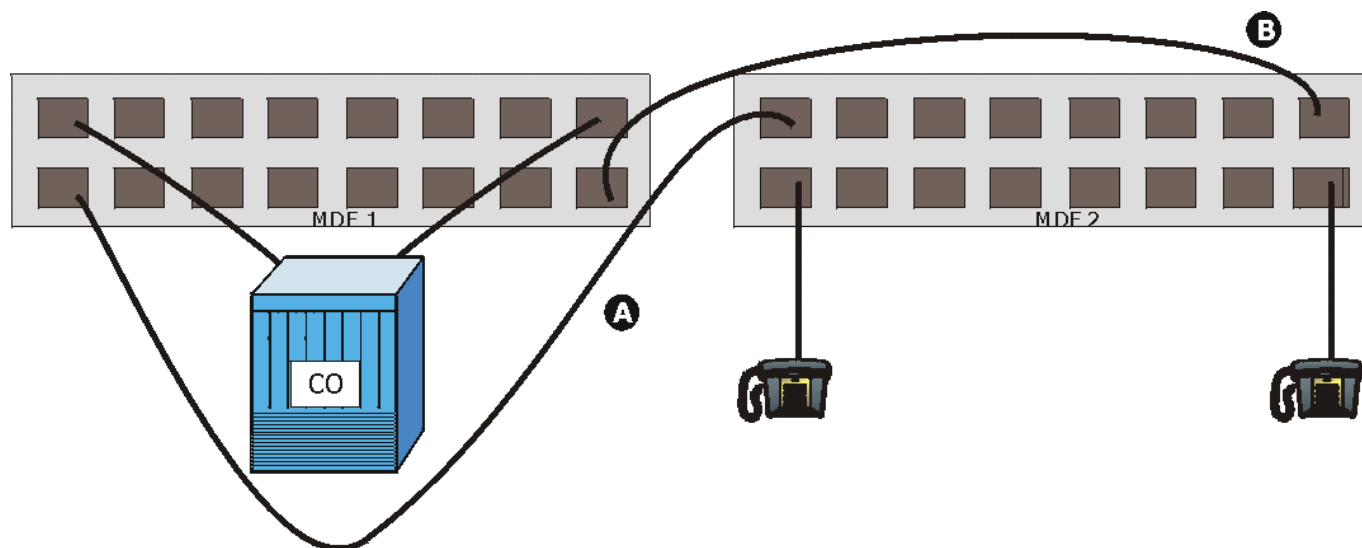
#### 4.4.4 Installation Scenario C

Phone service is also available but there are two MDFs; one for end-user telephone line connections and the other one for CO telephone line connections (see the following figure).

---

**Users A and B have telephone (only) service.**

---



**Figure 4-10 Two Separate MDFs for End-user and CO Connections**

Please refer to the following figure for the ADSL connection schema.

- MDFs 1 and 2 are the two original MDFs.
- MDFs 3 and 4 are two additional MDFs you need.

---

**User A still has telephone service only. User B now has ADSL service also (see the following figure).**

---

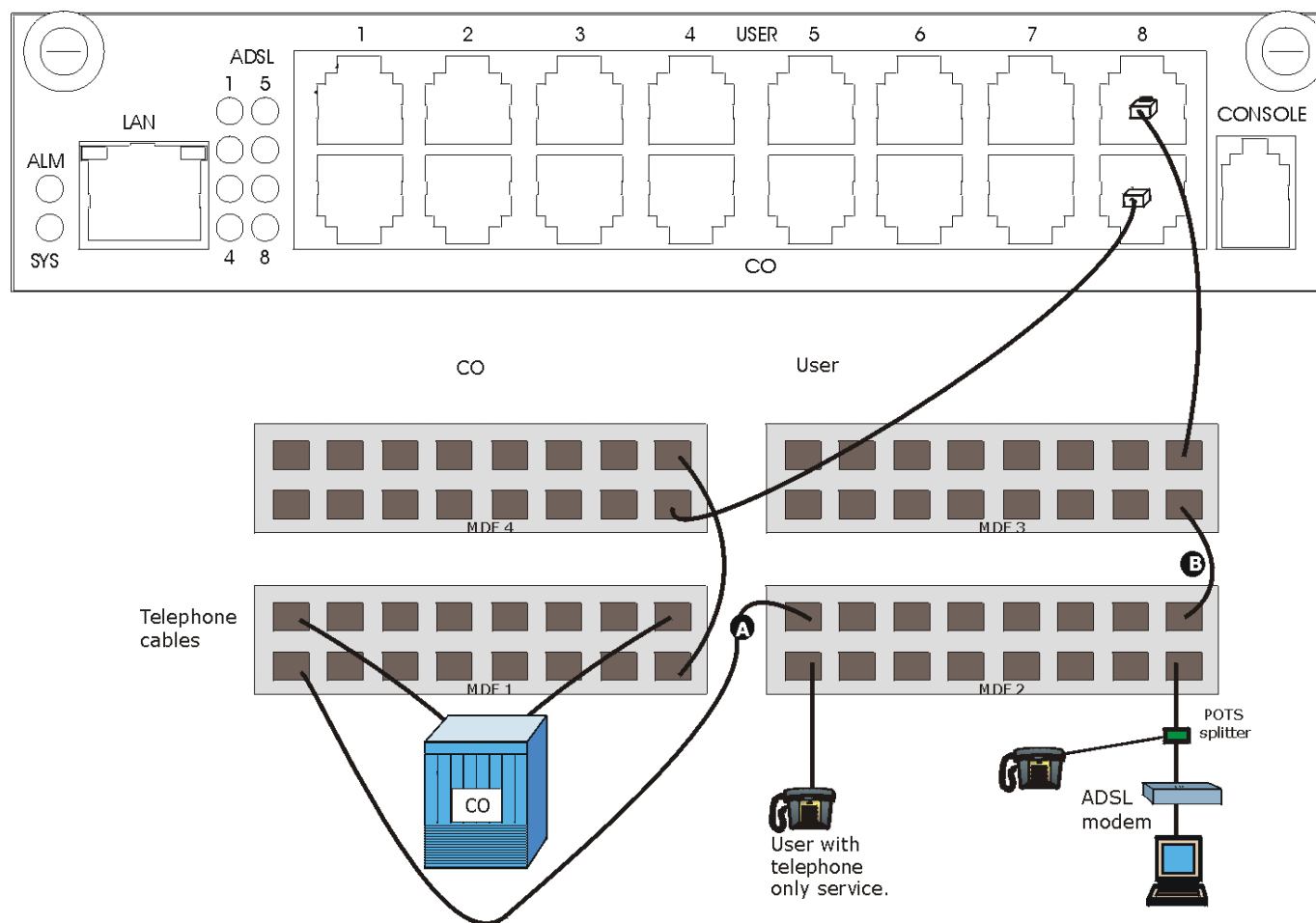


Figure 4-11 Installation Scenario C

## Procedure To Connect To MDFs

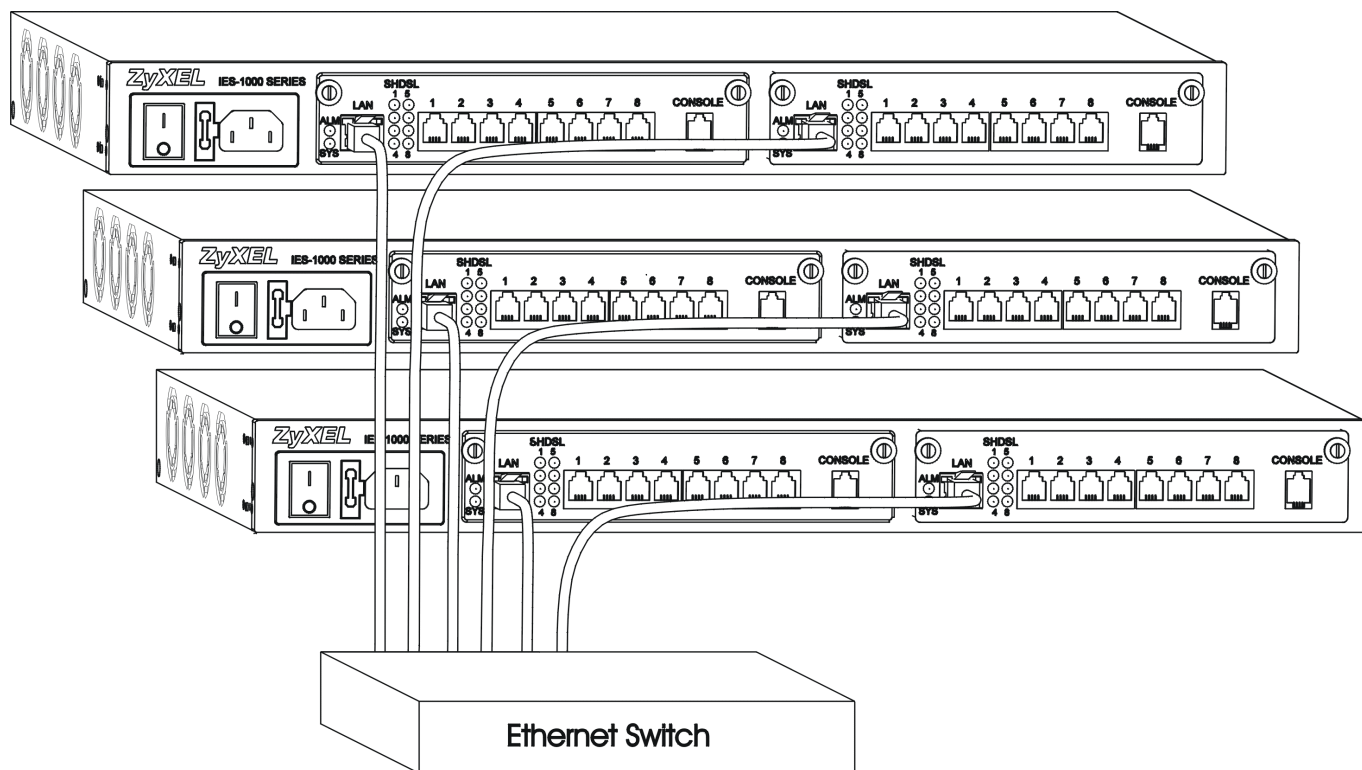
- Step 1.** Acquire two additional MDFs (3 and 4).
- Step 2.** Connect the RJ-11 connector ends of telephone wires you want for ADSL service to the **USER** ports on the AAM1008.
- Step 3.** Connect the other ends of the telephone wires to the upper ports of MDF 3 using a punch-down tool.
- Step 4.** Connect the lower ports of MDF 3 to the upper ports of MDF 2 for those users that want ADSL service. (Users who want telephone service only, retain the original connection from the top port of MDF 2 to the bottom port of MDF 1.)
- Step 5.** Connect the telephone wiring from the end-user's ADSL equipment to the lower ports of MDF 2.
- Step 6.** Connect the RJ-11 connector ends of telephone wires you want for voice service to the AAM1008's **CO** ports.
- Step 7.** Connect the other ends of the telephone wires to the lower ports of MDF 4 using a punch-down tool.
- Step 8.** Connect the top ports of MDF 4 to the bottom ports of MDF 1 using regular telephone wires.

Connect the top ports of MDF 1 to the telephone company.

### 4.4.5 LAN Port (Ethernet) Connection

Connect the LAN port of your SAM1008 to an Ethernet WAN switch using a straight-through Category 5 UTP (Unshielded Twisted Pair) cable with RJ-45 connectors. Connect the other end of the cable to an Ethernet switch.

You may stack multiple IES-1000 units up to the number of ports available on the Ethernet switch as shown next.



**Figure 4-12 Stacking Multiple IES-1000 Units**

### 4.4.6 Power Cord

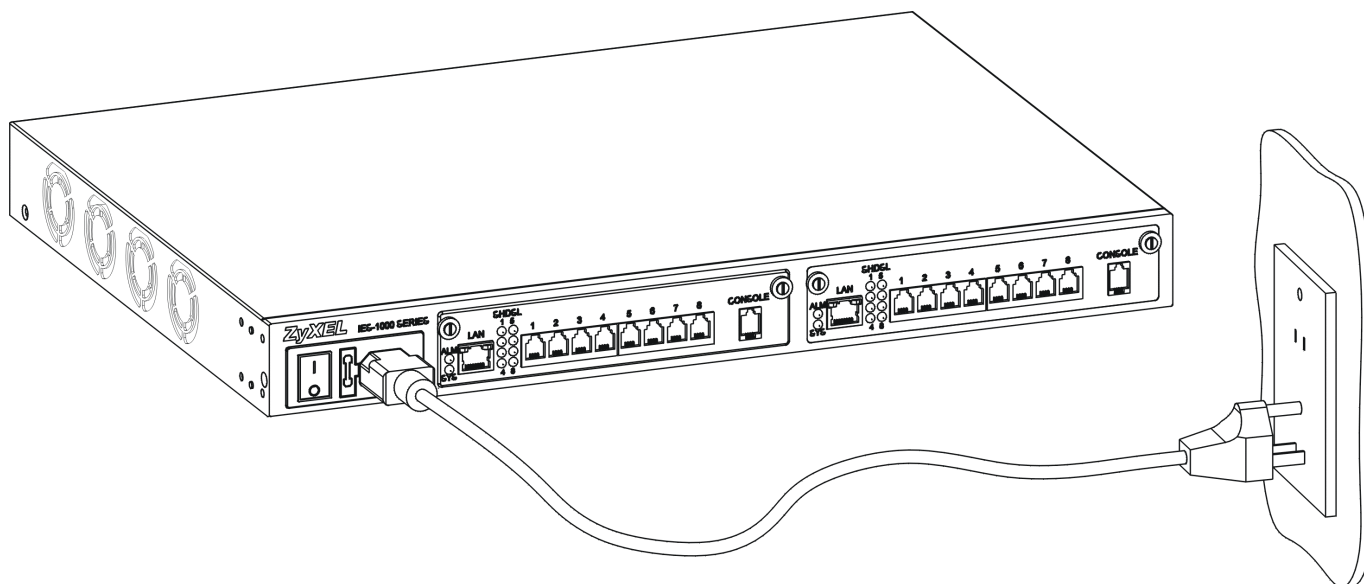
Connect the female end of the power cord to the power receptacle on the front panel of your IES-1000 (to the right of the fuse housing) as shown next. Connect the other end of the cord to a power outlet. Make sure that no objects obstruct the airflow of the fans (located on the side of the unit).



---

**Make sure you use a 100-240VAC/1A, 50/60Hz power source.**

---



**Figure 4-13 Connecting the Power Cord to the IES-1000 and a Power Source**



# Chapter 5

## Turning On Your IES-1000

*This chapter discusses the fans and LEDs of the IES-1000 after you turn it on.*

### 5.1 Introduction

Before turning on your IES-1000, make sure you:

- Have attached a computer to the IES-1000 serial port as explained previously.
- Can see the status LEDs on the front panel while you view the VT100 terminal emulator.

Push the power switch (located at the front of the IES-1000) to the ON or “I” position. The IES-1000 will automatically run a self-test that takes approximately 20 seconds. The SYS LED will remain on if your IES-1000 has started normally.

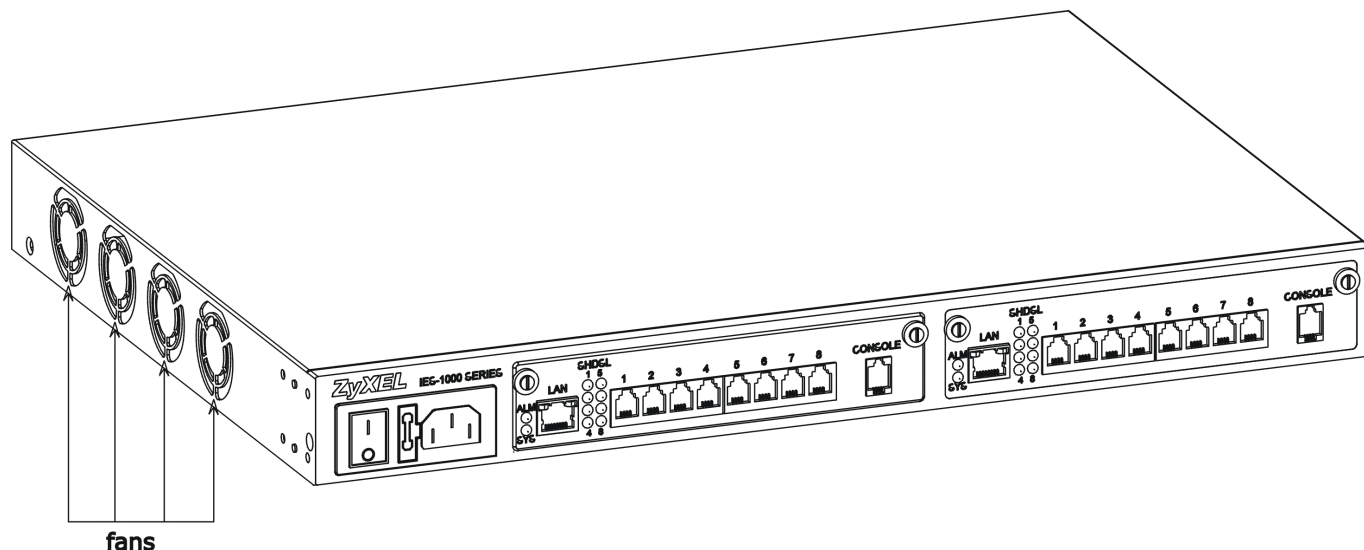
---

**If the SYS LED does not turn on then recheck your connections or refer to the *Hardware Troubleshooting* chapter.**

---

Make sure you can feel and/or hear the fans working — working fans emit a low buzz and blow air. The fans are located on the IES-1000 as shown next. Refer to the *Hardware Troubleshooting* chapter to test the fans if they are not working.

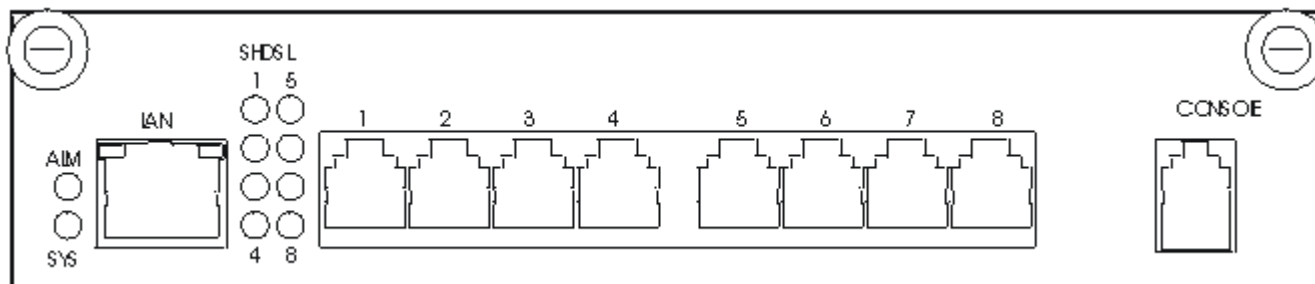
See the next section to interpret the operational status of your IES-1000.



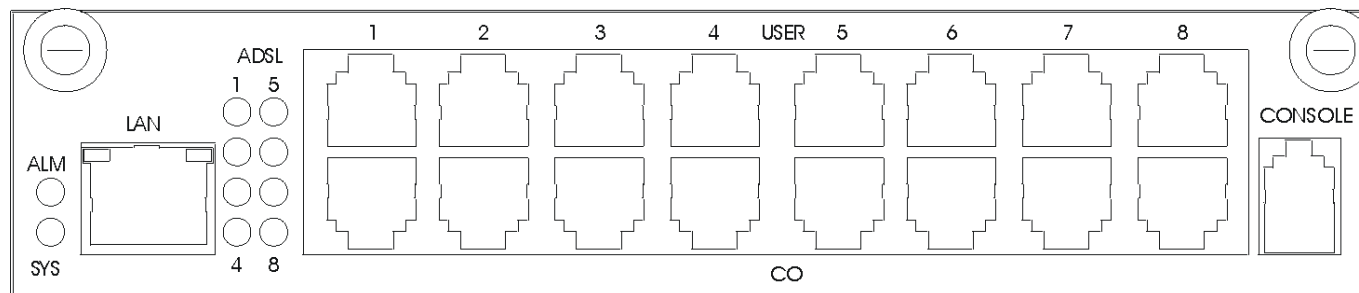
**Figure 5-1 Location of the IES-1000 Fans**

## 5.2 Network Module Front Panel LEDs

The following figures show the front panels of the network modules. LEDs describe the operational status of your network module. Please also refer to the *Hardware Troubleshooting* chapter to see how LEDs may aid in troubleshooting.



**Figure 5-2 SAM1008 Front Panel LEDs**



**Figure 5-3 AAM1008 Front Panel LEDs**

**Table 5-1 Network Module LED Descriptions**

LED	COLOR	STATUS	DESCRIPTION
ALM	Red	On	The module has overheated.
		Off	The module is functioning within normal temperature parameters.
SYS	Green	Blinking	The system is initializing.
		On	The module is on and functioning properly.
		Off	The system is not receiving power, is not ready or has a malfunction.
SHDSL (1-8) or ADSL (1-8)	Green	On	The DSL link is up.
		Off	The DSL link is down.
LAN	Green	Blinking	The system is transmitting/receiving to/from a 10 Mbps Ethernet network.
		On	The link to a 10 Mbps Ethernet network is up.
		Off	The link to a 10 Mbps Ethernet network is down.
	Yellow	Blinking	The system is transmitting/receiving to/from a 100 Mbps Ethernet network.
		On	The link to a 100 Mbps Ethernet network is up.
		Off	The link to a 100 Mbps Ethernet network is down.

# Chapter 6

## Hardware Troubleshooting

*This chapter explains how to troubleshoot IES-1000 hardware. Refer also to the Troubleshooting chapter in the User's Guide .*

### 6.1 System Startup

When you turn on the IES-1000, it automatically runs a self-test that takes approximately 20 seconds. The SYS LED will remain on if your IES-1000 has started normally.

#### 6.1.1 The SYS LED Does Not Turn On

**Table 6-1 SYS LED Troubleshooting**

STEP	CORRECTIVE ACTION
1	Make sure the power cord is connected properly to the power outlet. Make sure you are using the correct power source (100 watts maximum, 100-240VAC/1A, 50/60Hz).
2	Make sure the power connector and power wire on the IES-1000 are connected properly.
3	Make sure the network module is properly connected to the IES-1000 (refer to <i>Chapter 3</i> ).
4	Make sure the fuse is not burnt-out. Replace the fuse if it is burnt out. Refer to <i>the Removing and Installing a Fuse</i> appendix.
5	The LED itself or the unit may be faulty; contact your vendor.

### 6.2 The ALM LED Is On

The ALM (alarm) lights when the IES-1000 is overheated and/or the fans are not working properly and/or voltage readings are outside the tolerance levels.

**Table 6-2 ALM LED Troubleshooting**

STEP	CORRECTIVE ACTION
1	Make sure you can feel and/or hear the fans working - working fans emit a low buzz and blow air. If the fans are not working properly, make sure the power connector is connected properly. Contact your vendor if the fans do not work. Do not remove fans from the IES-1000. Only a qualified distributor should remove or repair fans.

## 6.3 The SHDSL LED(s) Do Not Turn On

The SHDSL LEDs show the operational status of SHDSL port connections. If the SHDSL LED is off, it means the link to the SHDSL modem/router is down or there is not a connection to the SHDSL port.

**Table 6-3 SHDSL LED Troubleshooting**

STEP	CORRECTIVE ACTION
1	Ensure that all hardware connections are correctly installed (including the modem/router on the subscriber's side) and that all devices are turned on.
2	Make sure the SAM1008 SHDSL port is enabled (refer to the <i>User's Guide</i> or <i>Quick Start Guide</i> ). The SHDSL ports are disabled by default.
3	Check the SHDSL line pin assignments shown in the <i>Pin Assignments</i> appendix.
4	Check the telephone wire connections between the G.SHDSL modem/router and the MDF(s).
5	Check the telephone wire and connections between the MDF(s) and ADSL port(s).
6	Check the telephone wire mapping on the MDF(s) – see section <i>Step 4</i> .
7	Make sure the in-house wiring works and is connected properly (refer to <i>Chapter 4</i> ).
8	Make sure the line speed is consistent between the IES-1000 side and the CPE (Customer Premise Equipment) side.
9	If your line quality is low, you may need to select a slower line speed for both the IES-1000 and CPE sides. Refer to the <i>User's Guide</i> .
10	Repeat the steps above using a different SHDSL port.

## 6.4 The ADSL LED(s) Do Not Turn On

The ADSL LEDs show the operational status of ADSL port connections. If the ADSL LED is off, it means the link to the ADSL modem/router is down or there is not a connection to the ADSL port.

**Table 6-4 ADSL LED Troubleshooting**

STEP	CORRECTIVE ACTION
1	Ensure that all hardware connections are correctly installed (including the modem/router on the subscriber's side) and that all devices are turned on.
2	Make sure the AAM1008 ADSL port is enabled (refer to the <i>User's Guide</i> or <i>Quick Start Guide</i> ). The ADSL ports are disabled by default.
3	Check the ADSL line pin assignments shown in the <i>Pin Assignments</i> appendix.
4	Check the telephone wire connections between the ADSL modem/router and the MDF(s).
5	Check the telephone wire and connections between the MDF(s) and ADSL port(s).
6	Check the telephone wire mapping on the MDF(s) – see section <i>Step 4</i> .
7	Make sure the in-house wiring works and is connected properly (refer to <i>Chapter 4</i> ).
8	Make sure the upstream and downstream line rates are consistent between the IES-1000 side and the CPE (Customer Premise Equipment) side.

**Table 6-4 ADSL LED Troubleshooting**

STEP	CORRECTIVE ACTION
9	If your line quality is low, you may need to select slower upstream and downstream line rates for both the IES-1000 and CPE sides. Refer to the <i>User's Guide</i> .
10	Repeat the steps above using a different ADSL port.

## 6.5 The LAN LED(s) Do Not Turn On

**Table 6-5 LAN LED Troubleshooting**

STEP	CORRECTIVE ACTION
1	Make sure the LAN port of your network module is connected to an Ethernet WAN switch with a straight-through Category 5 UTP (Unshielded Twisted Pair) cable with RJ-45 connectors.
2	<p>The factory default settings for the LAN (Ethernet) port of the network module are:</p> <ul style="list-style-type: none"> <li>➤ Speed: Auto</li> <li>➤ Duplex: Auto</li> <li>➤ Flow control: Auto</li> </ul> <p>If the IES-1000's auto-negotiation is turned off, an Ethernet port uses the pre-configured speed and duplex mode when making a connection, thus requiring you to make sure that the settings of the WAN switch Ethernet port are in the same order to connect.</p>

## 6.6 There Is No Voice on an ADSL Connection

The AAM1008 has internal POTS (Plain Old Telephone Service) splitters and CO side RJ-11 ports that allow the telephone wiring used for ADSL connections to also simultaneously carry normal voice conversations.

**Table 6-6 ADSL Voice Troubleshooting**

STEP	CORRECTIVE ACTION
1	Make sure the subscriber has a POTS splitter properly installed.
2	Check the ADSL line pin assignments shown in the <i>Pin Assignments</i> appendix.
3	Check the telephone wire connections between the subscriber and the MDF(s).
4	Check the telephone wire and connections between the MDF(s) and <b>USER</b> port(s).
5	Check the telephone wire and connections between the MDF(s) and the <b>CO</b> port(s). Check the connection from the MDF(s) to the telephone company or the PBX.
6	Check the telephone wire mapping on the MDF(s) – see section <i>Step 4</i> .
7	Make sure the in-house wiring works and is connected properly (refer to <i>Chapter 4</i> ).
8	Repeat the steps above using a different ADSL port.





# Appendix A

## Removing and Installing a Fuse

*This appendix shows you how to remove and install fuses for the IES-1000.*

The IES-1000 uses one 250V-3A fuse. The IES-1000 comes with two 250V-3A fuses; one is installed at the factory (in the fuse housing) and the other is a spare (also located inside the fuse housing). If you need to install a new fuse, follow the procedure below.

### Before you begin, you will need:

- A small flat head screwdriver
- A 250V 3A fuse
- Good lighting

### Removing and Installing Fuses

#### Removing Fuses

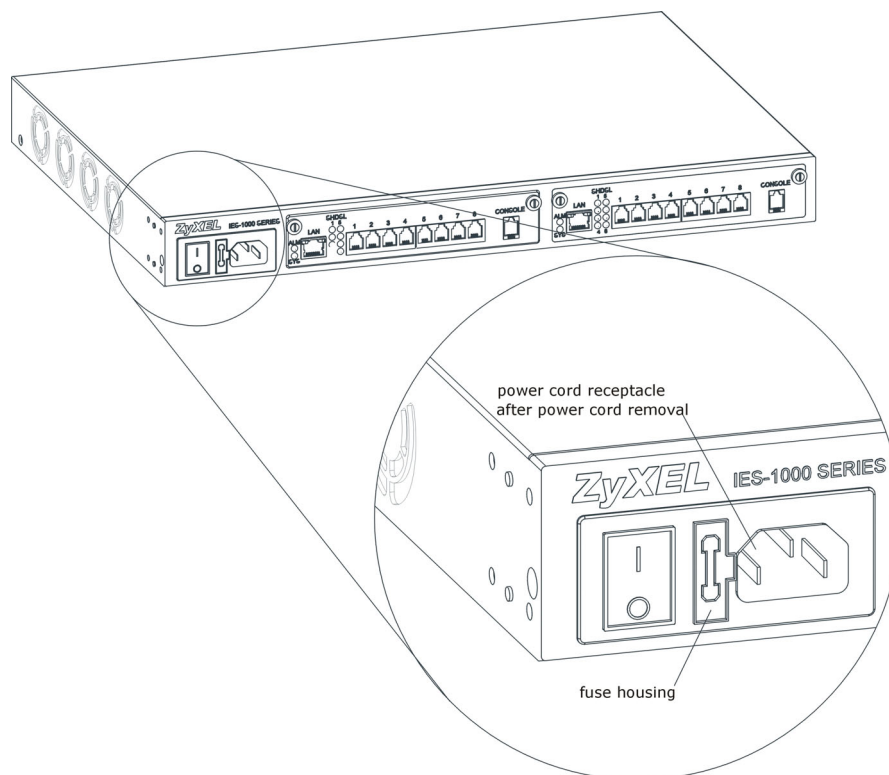
---

**Safety first! Disconnect all power from the IES-1000 before you begin this procedure.**

---

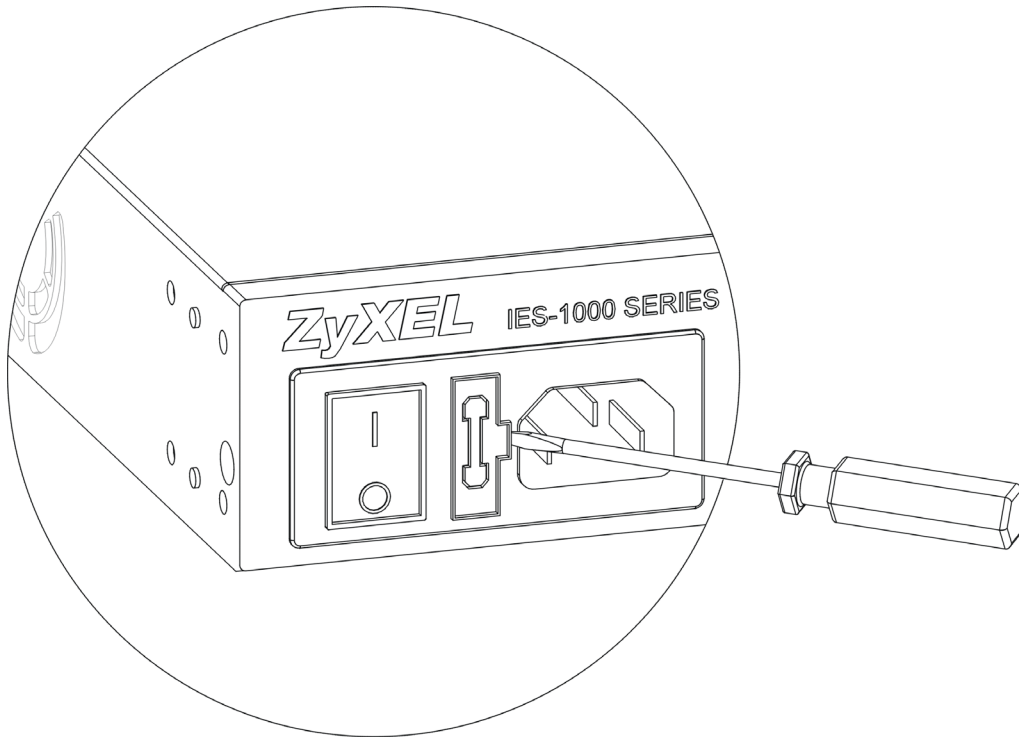
**Step 1.** Place the front panel of the IES-1000 in front of you.

**Step 2.** Remove the power cord from the back of the unit for easy access to the fuse housing as shown next.



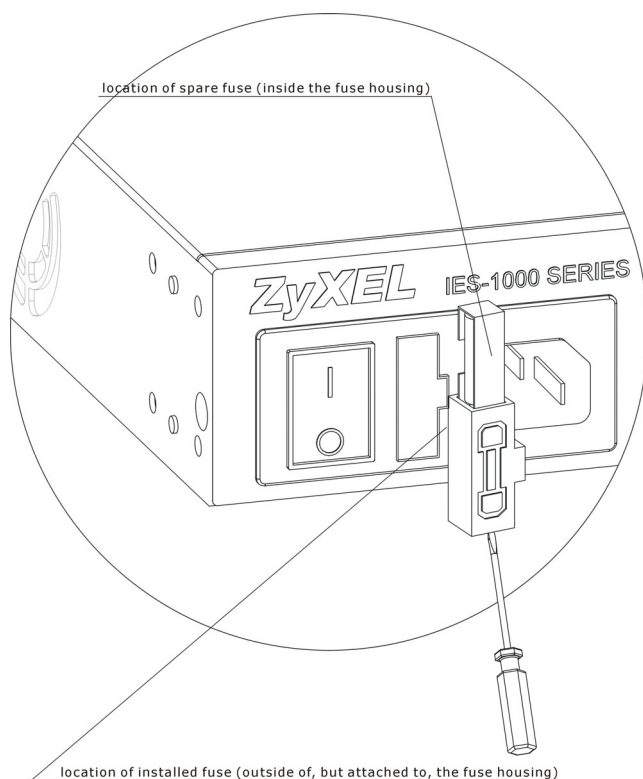
**Diagram 1 Removing the Power Cord**

- Step 3.** Using a small flat head screwdriver, gently pry open the right side of the fuse housing (located to the left of the power cord port receptacle) as shown next.



**Diagram 2 Opening the Fuse Housing**

- Step 4.** Gently pull the fuse casing from the IES-1000. The installed fuse is located attached to, and on the outside of the fuse housing; the spare fuse is located inside the fuse housing.



**Diagram 3 Locations of the Installed and Spare Fuses**

- Step 5.** Remove the burnt-out fuse from the IES-1000. A burnt-out fuse is blackened, darkened or cloudy inside its glass casing. A working fuse has a completely clear glass casing. Dispose of the burnt-out fuse.

### Installing Fuses

- Step 1.** After removing the burnt-out fuse, gently push the replacement fuse into the same location as the old fuse until you hear a click.
- Step 2.** Firmly, but gently, push the fuse housing back into the IES-1000 housing until you hear a click.
- Step 3.** Plug the power cord back into the IES-1000.

## Appendix B

### Pin Assignments

#### Mini RJ-11 4P4C (Console Port) Pin Assignments

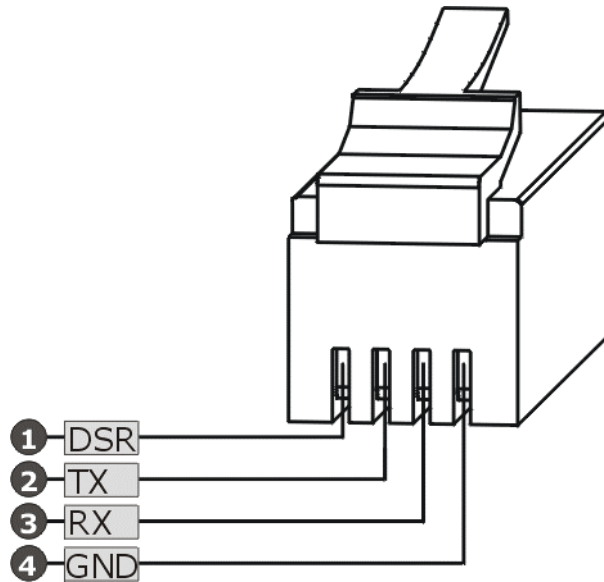


Diagram 4 RJ-11 4P4C (Console Port) Pin Assignments

#### RJ-11 6P2C (SHDSL Ports on the SAM1008 and ADSL USER or CO Ports on the AAM1008) Pin Assignments

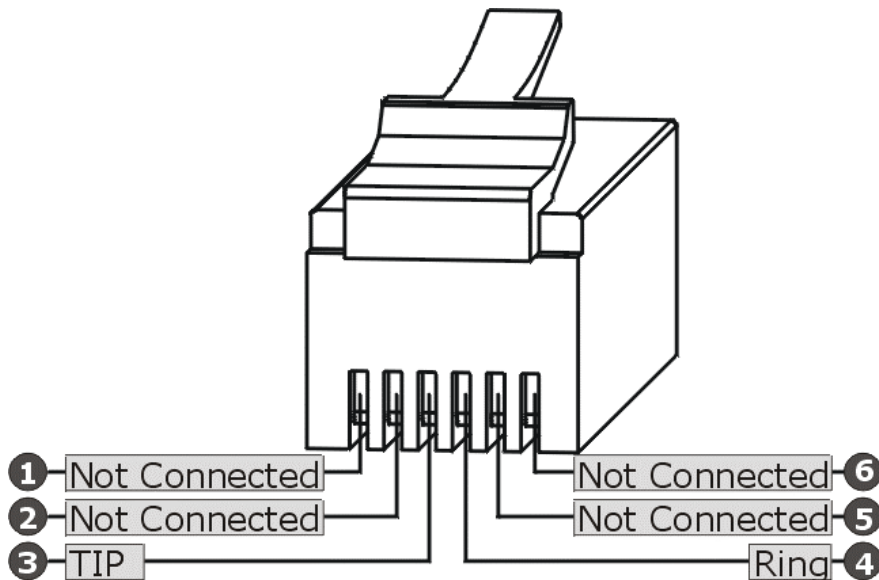


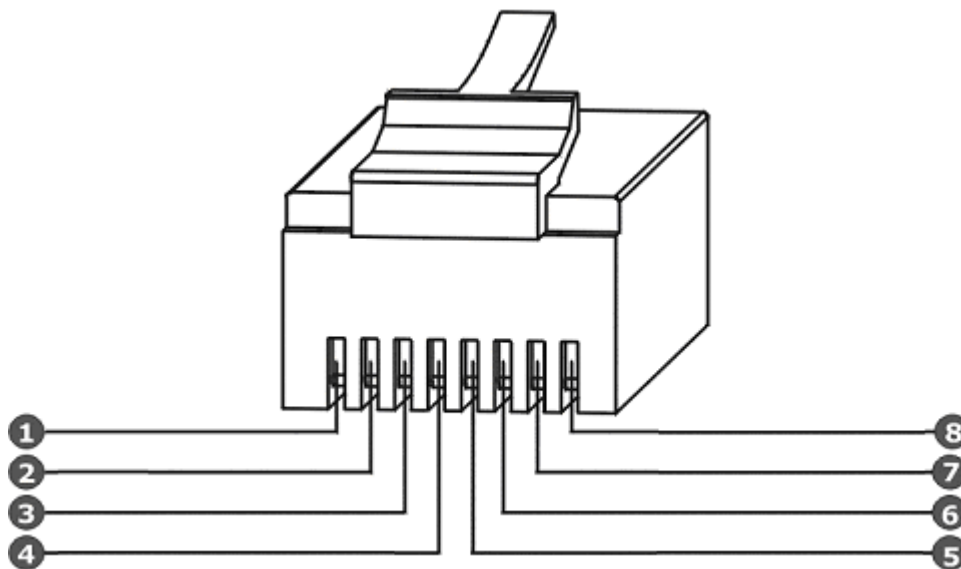
Diagram 5 RJ-11 6P2C (SHDSL Port) Pin Assignments

---

**Note that a 2, 4 or 6 pin connector can be used with this port provided pins 3 and 4 connect to a SAM1008 SHDSL port.**

---

### RJ-45 (LAN Port) Pin Assignments



**Diagram 6 RJ-45 (LAN Port) Pin Assignments**

1 = TX+	8 = Not Connected
2 = TX-	7 = Not Connected
3 = RX+	6 = RX-
4 = Not Connected	5 = Not Connected

# Appendix C

## Hardware Specifications

### Physical Interfaces

#### IES-1000

- Two slots for a total of up to two hot-swappable xDSL network modules
- Power receptacle
- 19" 1U rack-mountable, wall-mountable unit
- Each network module has one mini RJ-11 console port for local configuration and management

#### SAM1008 G.SHDSL Network Module

- Eight RJ-11 6P2C interfaces for G.SHDSL service that conform to the G.991.2 standard
- One mini-RJ-11 4P4C interface for local console connection
- One RJ-45 10/100Base-TX auto-negotiation interface. This Fast Ethernet port is compliant with IEEE802.3 and IEEE802.3u standards
- LED indicators for system status, overheat warning (ALM), 10/100M Ethernet (LAN) and G.SHDSL interface status

#### AAM1008 ADSL Network Module

- Eight RJ-11 6P2C interfaces for ADSL service
- One mini-RJ-11 4P4C interface for local console connection
- One RJ-45 10/100Base-TX auto-negotiation interface. This Fast Ethernet port is compliant with IEEE802.3 and IEEE802.3u standards
- LED indicators for system status, overheat warning (ALM), 10/100M Ethernet (LAN) and ADSL interface status

### Other Hardware Features

- Built-in fans
- Temperature sensors for temperature monitoring
- Surge protection to prevent lightening damage

### Dimensions

440mm (W) x 320mm (D) x 44.45mm (H)

### Weight

- One IES-1000 (no modules) = 3.6 kg
- One SAM1008 = .8 kg

- One AAM1008 = 1.1 kg

**Power Consumption**

- 60 watts maximum
- 100-240VAC/1A, 50/60Hz

**Fuse Rated**

- T3A 250VAC

**Operating Environment**

- Temperature: 0°C — 50°C
- Humidity: 5% — 95%

**Storage Environment**

- Temperature: -25°C — 70°C
- Humidity: 5% — 95%





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